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ABSTRACT

In January 1987, California State University, Fullerton (CSUF), began to explore the potential of interactive videodisk (IVD) technology on its campus. The challenge of introducing an individualized instructional technology into a cost conscious and conventional teaching environment was formidable, considering the traditional orientation of instructors and the existing reward structure. Demonstration projects in business, chemistry, and foreign languages were developed to illustrate the multi-disciplinary nature of IVD. A simple-to-use IVD lecture authoring/presentation system was developed. A CSUF directory videodisk, intended to inform users about academic and nonacademic programs at the university, was designed and programmed in order to demonstrate the versatility of the medium to administrators and gain their support. In June 1988, CSUF hosted a two-day symposium for 140 faculty members of the California State University system in order to disseminate information about the IVD program. The formulation of a CSU IVD consortium was proposed and discussed. In September 1988, California State-Fullerton's successes resulted in the receipt of educational grants and industrial contribution to allow it to begin to assemble a multi-disciplinary IVD learning center. The center, comprised of 10 IBM InfoWindow Systems, is located on the main floor of the central library and scheduled to begin operations in the spring of 1989. (Author/GL)

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Interactive Videodisc at California State University, Fullerton

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Introduction

In December, 1986, the Dean of the School of Business at California State University, Fullerton (CSUF) issued a Request For Proposals (RFP) from full time faculty regarding the use of Interactive Videodisc (IVD) technology in the business curriculum. At that time, CSUF's experience with interactivity had been limited mainly to the use of mainframe timesharing terminals, and more recently, to student and faculty use of micro computer laboratories. By December, 1988, CSUF had established a ten station interactive videodisc learning center located in the central library, servicing the multi disciplinary needs of the entire university. This paper describes the rationale and methodologies that enabled this to take place.

The Proposal

The RFP that was issued by the Dean requested that all responses contain an overall conceptual strategy including a multi stage plan for implementation. Proposals were judged on the basis of the qualifications of the respondents, the practicality of the plan, and the benefits to the students and faculty of the School of Business and the University.

California State University, Fullerton is one of nineteen universities within the California State University (CSU) System. The mandate of the more than 600 faculty of CSUF is to provide high quality instruction to its 25,000 students. For the most part, this instruction is carried out through traditional lectures taught to relatively small classes of fewer than 40 students. While in many ways this process is a strength of the university, from an IVD implementation standpoint this philosophy presents many significant challenges.

The Challenge of Traditions

Interactive laserdisc is a technology best suited for individualized user/machine interactions - whether that be via retail kiosks, or at instructional workstations. Consequently, anyone wishing to introduce IVD into a conventional educational institution must address the potential conflict presented by a technology with a set of characteristics completely at odds with the institution in which it is to be implemented.

Traditional educational institutions accept as the norm that a teacher prepares a lesson and "speaks" it to a large audience. The amount of instructor/student interaction largely depends on the instructor's

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inclination. Where such practices have been taking place for years, it is very difficult to introduce the methodologies of individualized instruction.

In general, in institutions where lecturing is the preferred instructional mode, lecturers have large investments in the process, both in terms of prepared materials, and also in terms of their own egos. Most full time (tenured) instructors consider themselves to be outstanding communicators whose teaching skills are exemplary, and most do not perceive a need to introduce new instructional techniques, regardless of their proven worth. Even in cases where this is not so, instructors understand that change, particularly that which involves technology, can require a significant investment in time.

Traditional colleges and universities present another drawback to the introduction of individualized technologies in the classroom. Usually, these institutions do not have facilities designed for individualized learning workstations. Conventional classrooms and laboratories are ill-equipped for the physical requirements of such sites, and the scarcity of space often precludes the possibility of easily building new learning centers.

What's In It For the Instructor?

Most universities and colleges do not reward instructors for curriculum development. Teaching is often considered a minimum condition of employment, with rewards of promotion or tenure based on research, publications, and professional service and committee work. The development of innovative or unique classroom teaching materials, however impressive, is usually a matter between the instructor and his/her students - none of whom is influential in matters of tenure and promotion.

In the event that instructors can be convinced, or are sufficiently enlightened to recognize the value of individualized instruction, the reality is that the design and implementation of individualized learning materials is a complex technical undertaking whose demands on instructors can exceed their expectations.

Individualized instructional material is difficult to design, prepare, and test. The process is very time-consuming, and often the results are disappointing, eliciting few accolades for the designer. In fact, one of the biggest drawbacks to creating such materials, and one that is difficult to find documented in "the literature," is that the final result will probably receive less than rave reviews from the instructor's peers.

Such material, especially if has been developed outside of a commercial enterprise, is often the subject of the NIH ("not invented here") syndrome. Critics of these materials are not in short supply, each proclaiming the ability to do a better job if he/she were to undertake a similar project. (Evidence of this phenomenon can be seen in the proliferation of introductory level textbooks that abound in every discipline. Presumably these exist because of authors' beliefs

that no existing introductory text is as good as the one they can write.)

Cost/Benefits

The benefits of IVD in industrial training are well documented. These benefits, at a minimum, include reduced training time and improved learning levels. In addition, the value of these benefits is amplified when factors of cost avoidance are used to weigh off the costs of the technology.

The actual benefits and the related accounting advantages used to justify the industrial use of IVD are usually irrelevant in publicly funded post secondary institutions. For example, there is virtually no value in students' completing course material any sooner than that defined by the conventional undergraduate term. In most traditional instruction, cost avoidance arguments such as the elimination of instructor travel expenses are simply not a consideration. Finally, funding and expenditure policies of educational institutions are completely different than those used in commercial enterprises. This is particularly true in terms of depreciation of capital equipment, as well as the private sector's motivation to save rather than spend at the end of a fiscal year.

In traditional college and university environments the cost per student contact hour is usually measured in terms of class size. The procedure often used to optimize on this variable is to increase class size and at the least, to try to hold the quality of learning constant.

Meeting The Challenge

Because it was impossible to ignore these environmental factors at CSUF, it was decided that an evolutionary rather than revolutionary strategy be adopted. The plan was to introduce IVD in a manner that would not conflict with existing patterns, but would demonstrate the benefits of the technology to the broadest possible base of users.

1. Overcoming Fears. To many people unfamiliar with it, IVD is often perceived as another manifestation of computer technology whose value, if there is any at all, can mainly be derived in traditional number-crunching or esoteric disciplines such as engineering, science, or mathematics.

Because of the enormity of the "challenge" at CSUF, it was decided that a few interested faculty members from a broad range of disciplines be recruited to help "spread the message." A project team of four professors, one from the School of Business, two from Chemistry, and one from Foreign Languages was organized for this project. This group provided the manpower required for the task and also represented the multi disciplinary benefits of IVD. Except for the business professor, none of these people had previous experience in this field.

2. Introducing a New Technology. Though IVD has been available for years both as a consumer and as a commercial product, many faculty and administrators were completely unaware of its application, particularly its widespread use in training. Consequently a series of campus-wide seminars and tutorials was organized for faculty and administrators, mainly to sensitize them to the existence and benefits of commercially available IVD products. Seminars were held throughout the first year and were targeted towards potential users (professors) and potential funding benefactors (administrators). The seminars did not focus on the physics of laser discs; instead, companies were invited to present their hardware and courseware products and to focus on the successful use of those products.

3. The Problem of Course Development. Initially, it was unrealistic to expect instructors to develop their own videodiscs. Catalogs of generic courseware were collected from as many sources as possible. This courseware fell into two categories - 1) commercially available, (expensive) courseware intended for individualized learning centers, and 2) inexpensive audio/visual videodisc databases, usually available from publicly funded sources.

This latter category was of primary interest in the first phase of this project. It was felt that if a broad range of university faculty was made aware of the existence of these inexpensive videodiscs, they might begin to consider the possibility that this material might have some use in their own classes, somewhat as they might use slides, films, or videotapes.

Based mainly on the availability of this category of videodiscs, CSUF faculty were introduced to the concept of "repurposing." In general, potential generic videodisc users were told to try to ignore the original purpose of an existing videodisc, and to consider how they might use videodisc-based A/V vignettes in their own classes for their own students.

5. The Problem of Hardware. Many IVD centers attempt to minimize startup costs by acquiring equipment for the least possible cost. These systems are usually comprised of components from a variety of hardware manufacturers, all integrated into a somewhat unique IVD workstation.

As commercial enterprises have discovered over the years, this approach can be very costly in the long run. When hardware problems arise, as they inevitably do, the system supplier may no longer be in business or the equipment warrantee may no longer be valid. Even if it is, none of the component suppliers may accept responsibility for the problem - each accusing the other of being the cause of the difficulty.

The CSUF project was not initiated for the purpose of dealing with such engineering problems. Its goals were to implement IVD technology for the benefit of students and faculty. The decision was made early in the project, that any IVD equipment that would be used would be supplied from legitimate and recognized vendors.

When consideration was also given to the potential use of available generic courseware, the number of possible hardware vendors was considerably reduced. In the first phase of the project it was decided that IBM InfoWindow Systems would meet these criteria. To the surprise of the University purchasing department, IBM's desire to promote its IVD products among education customers led to the discovery that IBM's educational discounts resulted in costs that compared quite favorably with competitive workstations.

The benefits of choosing IBM InfoWindows were 1) favorable pricing, 2) it was the emerging IVD industry standard, 3) the equipment was unlikely to become obsolete and/or unsupported, 4) it allowed CSUF to use the broadest base of generic courseware, 5) there existed a large and growing base of users with whom problems could be discussed, and 6) it provided a single reputable equipment supplier that could be harassed and blamed should hardware problems arise!

The First Projects

With the above decisions in mind, the four members of the project team decided to undertake a number of projects that would illustrate the viability of the technology in the CSUF environment. To carry out these projects, four IBM InfoWindow Systems were purchased.

1. Department of Chemistry. The two faculty members involved in this project undertook to investigate the application of IVD for the graphical representation of dynamic molecular models. Their plan was to begin the development of course material that needed the large data storage capacity offered by laserdisc technology. This stems from the sizable storage required to maintain the dynamic data models that such course material would utilize.

2. Department of Foreign Languages. A generic videodisc that was originally developed for instruction of conversational German was acquired from CALI Research (Brigham Young University). The disc was used as the basis for the development of a Level III instructional program in conversational German. The courseware was programmed using IBM's authoring system IWPS (InfoWindow Presentation System) together with Turbo Pascal from Borland International. The project illustrated the use of generic discs, the value of the IBM standard (in terms of software), and versatility of IVD in non technical subject areas.

3. School of Business. Two projects were undertaken in this discipline, one to address the problem of the lecture environment that was discussed above, and the second to promote additional IVD activities at CSUF.

3.1 The Problem of Lecturing. In order to address some of the difficulties associated with introducing IVD into a lecture-oriented environment, a project was undertaken to illustrate that generic discs could be used successfully in an ongoing lecture environment using conventional and existing classroom A/V equipment.

Permission to create a set of experimental check discs was obtained from the copyright owners of a videotape series used in introductory courses in Management Information Systems. In the first part of this project, an InfoWindow System was moved into a classroom equipped with daisy chained video monitors, and connected to the display network. The check disc material, controlled via the laserdisc player's remote control unit, was used by the instructor to illustrate concepts being presented in the lecture. The ability to interrupt and restart the material as required was a significant improvement over a Level I-type videotape presentation.

Although this test demonstrated the practicality of using IVD in a conventional lecture, it did not begin to use the synergy available from the computer plus laser technologies that are available in a Level III interaction. To accomplish this, a simple-to-use, non technical, English-oriented authoring language was developed to provide better videodisc control to an instructor using IVD in his lecture.

This system, called TAPS (The Authoring/Presenting System) requires the instructor to pre-select the (CAV laserdisc) vignettes that will be used in the lecture. The authoring system leads the instructor through a simple procedure that allows for the tailoring of the vignettes to the lecture material, capturing video frame and audio track numbers that will be played in the lecture. During the lecture the instructor merely selects items from a system-generated, instructor-defined menu of topics presented by the Level III system.

Overall, this project was very successful in illustrating that 1) IVD technology can be effectively used in a lecture environment, 2) few changes to existing lecture material are required, 3) a minimum effort of extra course preparation is needed, 4) generic course material can be used, 5) little previous computer experience is necessary, and 6) IVD can be used cost-effectively in publicly funded educational institutions (one workstation presenting material to 40 students at a time).

3.2 Promotional Activity. If IVD activities at CSUF were to expand beyond this first phase, it was critical to solicit the support of university administrators. To accomplish this it was necessary to demonstrate that IVD could be used to meet some of the broader university objectives in which administrators are involved. Some of these include such campus promotion activities as student recruitment, outreach programs, community service, extended education, etc.

To accomplish this, existing promotional film footage of the university campus was selected, edited, and used to manufacture a videodisc database of CSUF A/V material. Using IWPS, an interactive CSUF directory videodisc was developed to illustrate the promotional value of the technology. Using computer generated graphics and menus, the Level III disc was designed to inform users about academic and non academic programs available at the university.

In order to illustrate the multi-dimensional value of IVD, the

directory disc was demonstrated to a wide range of university personnel, ranging from faculty members to the president. In addition to its use as a directory, the disc has also been demonstrated in lecture-mode, using TAPS, demonstrating the versatility of the disc in high school recruiting sessions.

This project was very useful because it demonstrated that videodiscs can be produced inexpensively from existing film footage using very straightforward computer techniques that do not require sophisticated computer programming.

The First Annual California State University IVD Symposium

In the Autumn of 1987, it was determined that there was sufficient IVD activity within the CSU System to justify an information exchange meeting. The CSU Chancellor's Office granted a funding request for such a meeting to be held on the CSUF campus on June 1 and 2, 1988.

Invitations were sent to the Vice President of Academic Affairs at the other 18 campuses requesting that each send two delegates to attend a CSU IVD Symposium. Although funding had been provided for approximately 40 attendees, actual attendance exceeded 140. One third of the audience was composed of those actively involved in IVD, one third were planning to become involved, and one third wanted to learn more about the technology's potential for their campus.

The first day's schedule consisted of presentations by CSU faculty who described IVD projects at each of their campuses. On the second day, invited executives from IBM, Apple, Pioneer, and TEAC described each of their company's plans and philosophies regarding laserdisc technology.

In the afternoon of the second day, the audience broke off into work groups, each assigned the task of defining the requirements for a California State University IVD Consortium. Each group later presented the results of its session to the main body. A final report containing the recommendations of the group is now being prepared.

The Symposium was considered an outstanding success, and plans for the Second Annual Symposium are currently underway.

CSUF's Second Phase

At the end of the first year (June,1988), all the initial objectives of the CSUF IVD project had been met and surpassed. Successful implementation of an extensive set of (commercially available and locally developed) materials had been demonstrated to a broad range of university personnel. Most objections to the technology could be refuted through the work that had been done in the first phase. The value of IVD was no longer in question and its potential in many applications and at many other campuses within the CSU System had become apparent.

A proposal to create a ten workstation IVD learning center was prepared and submitted to internal CSUF funding committees. At the same time, financial assistance was sought from hardware and courseware vendors. Funds and support were forthcoming, resulting in the establishment of an IVD learning center on the main floor of the university's central library. The center which houses ten IBM InfoWindow Systems will be fully operational in the Spring of 1989, only two years after the first project was undertaken.

The learning center will be used to support the instructional and training needs of students, faculty, and staff. Initial plans include the center's use for Level III instruction for students in the Business School and in the School of Humanities and Social Sciences. Plans are also underway to utilize the center for instruction in the use of library facilities, student advisement, continuing education, goal setting, project planning, and staff training.

Conclusion

Although IVD can be an intimidating and complex technology, selective and wise decisions can be made to minimize the risks and costs associated with its implementation. There is little doubt that the rewards are available if this can be accomplished.

In 1987, California State University, Fullerton decided to explore procedures to implement IVD on its campus. Through careful planning and with a minimum of expense the university has been successful in developing a variety of useful videodiscs and establishing a multi-disciplinary IVD learning center that will ultimately serve the needs of the university's students and faculty.

Current plans, based on continued success at CSUF and at other CSU universities, call for the eventual formation of a California State University Interactive Videodisc Consortium.